Positive Isolation Valve—Normally Open

The VACCO Normally Open Positive Isolation Valve (PIV) is an ordinance-free “Drop-In” replacement for Pyrovalve applications. Features include all-welded titanium construction and a robust, electrically redundant non-pyro actuator. The normally open PIV features a metal-to-metal seat that provides a positive seal against internal leakage after actuation. The thick-walled titanium pressure boundary prevents external leakage when open or closed.

The PIV actuation mechanism closes the valve with a 100% force margin independent of inlet pressure. The PIV eliminates the explosion hazard, blow-by and shock loads inherent to traditional Pyro Valves.

Features

- High Operating Pressure (5,000 psi)
- High Flow Capacity
- All Welded Against External Leakage
- Robust Actuation Mechanism:
  - Eliminates Pyrotechnic Charge
  - Low Shock
  - Eliminates Blow-By
  - Electrically Redundant
  - Uses Existing Circuits
- Positive Isolation:
  - High Stress Metal-to-Metal Seat
  - Virtually Zero Debris Generation
  - Eliminates “Bounce Back”

Operating Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet / Outlet Pressure Range</td>
<td>0 to 5000 psig</td>
</tr>
<tr>
<td>Proof Pressure</td>
<td>7500 psia</td>
</tr>
<tr>
<td>Burst Pressure</td>
<td>7500 psia</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-34°C to +77°C</td>
</tr>
<tr>
<td>Flow Capacity</td>
<td>0.128 inch ESEOD</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>24 to 32 VDC</td>
</tr>
<tr>
<td>Inlet/Outlet Tubes</td>
<td>1/4 or 3/8 inch Ti</td>
</tr>
<tr>
<td>Iso Valve Response</td>
<td>&lt; 40 sec</td>
</tr>
<tr>
<td>Internal Leakage</td>
<td>&lt;1 X 10⁻⁶ sccs GHe</td>
</tr>
<tr>
<td>External Leakage</td>
<td>&lt;1 X 10⁻⁶ sccs GHe</td>
</tr>
<tr>
<td>Weight</td>
<td>132 grams (0.29 lbm)</td>
</tr>
</tbody>
</table>
Positive Isolation Valve

Actuator Mechanism maintains valve in the open condition until actuated.

When pulse is applied, Actuator seals metal-to-metal Seat with 100% force margin.

Pressure compensated hermetic metal-to-metal Seat seals to 12,500 psi.

Electrical Schematic

```
   RED
  /    \  \\
24 to 32 Vdc PRIMARY
       / \       \\
  RED   \  /  RED

  BLACK
  /    \  \\
24 to 32 Vdc BACKUP
       / \       \\
  BLACK
```
Positive Isolation Valve—Normally Closed

The VACCO Normally Closed Positive Isolation Valve (PIV) is an ordinance-free “Drop-In” replacement for Pyrovalve applications. Features include all-welded titanium construction and a robust, electrically redundant non-pyro actuator. The normally closed PIV features a Frangible Seat that provides a positive seal against internal leakage after actuation. The thick-walled, all-welded titanium pressure boundary prevents external leakage when open or closed.

The PIV actuation mechanism opens the valve with a 100% force margin independent of inlet pressure. The PIV eliminates the explosion hazard, blow-by and shock loads inherent to traditional Pyro Valves.

Features

- High Operating Pressure (5,000 psi)
- Positive Isolation:
  - Hermetic Titanium Barrier
  - Burst Tested to 20,000 psi
- All Welded Against Leakage
- Robust Actuation Mechanism:
  - Eliminates Pyrotechnic Charge
  - Low Shock
  - Precludes Blow-By
  - Electrically Redundant
  - Uses Existing Circuits
- Frangible Seat:
  - High Flow Capacity
  - Minimal Debris Generation
  - Positive Retention of Seat Parts

Operating Parameters

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<td>Internal Leakage</td>
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<tr>
<td>External Leakage</td>
<td>&lt; 1 X 10⁻⁶ scs GHe</td>
</tr>
<tr>
<td>Weight</td>
<td>100 grams (0x22 lbm)</td>
</tr>
</tbody>
</table>
Performance Characteristics

Actuator Mechanism maintains valve in the closed condition until actuated.

When an electrical pulse is applied, Actuator fractures Frangible Seat to open flow path with 100% force margin.

Hermetic Frangible Seat has been hydrostatically tested up to 20,000 psi without failure.

Electrical Schematic

- RED
- 24 to 32 Vdc PRIMARY
- RED
- BLACK
- 24 to 32 Vdc BACKUP
- BLACK
The VACCO Normally Open Positive Isolation Valve (PIV) is an ordinance-free “Drop-In” replacement for Pyrovalve applications. Features include all-welded titanium construction and a robust, electrically redundant non-pyro actuator. The normally open PIV features a metal-to-metal seat that provides a positive seal against internal leakage after actuation. The thick-walled titanium pressure boundary prevents external leakage when open or closed.

The PIV actuation mechanism closes the valve with a 100% force margin independent of inlet pressure. The PIV eliminates the explosion hazard, blow-by and shock loads inherent to traditional Pyro Valves.

Features

- High Operating Pressure (5,000 psi/345 bar)
- High Flow Capacity
- All Welded Against External Leakage
- Robust Actuation Mechanism:
  - Eliminates Pyrotechnic Charge
  - Low Shock
  - Eliminates Blow-By
  - Electrically Redundant
  - Uses Existing Driver Circuits
- Positive Isolation:
  - High Stress Metal-to-Metal Seat
  - Virtually Zero Debris Generation
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<td>12500 psia/862 bar</td>
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<td>Operating Temperature</td>
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<tr>
<td>Flow Capacity</td>
<td>0.128 inch ESEOD/3.25 mm</td>
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<tr>
<td>Operating Voltage</td>
<td>24 to 32 VDC</td>
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<tr>
<td>Iso Valve Response</td>
<td>&lt; 120 Sec</td>
</tr>
<tr>
<td>Internal Leakage</td>
<td>&lt; 1 X 10^-6 scs GHe</td>
</tr>
<tr>
<td>External Leakage</td>
<td>&lt; 1 X 10^-6 scs GHe</td>
</tr>
<tr>
<td>Weight</td>
<td>0.50 lbs (227 gms) max</td>
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Actuator Mechanism maintains valve in the open condition until actuated.

When pulse is applied, Actuator seals metal-to-metal Seat with 100% force margin.

Pressure compensated hermetic metal-to-metal Seat seals to 12,500 psi.

### Electrical Schematic

- **28 VDC**
  - PRIMARY COIL
  - REDUNDANT COIL
- **GND**
  - PRIMARY THERMISTOR
  - REDUNDANT THERMISTOR
Positive Isolation Valve—Normally Closed

The VACCO Normally Closed Positive Isolation Valve (PIV) is an ordinance-free “Drop-In” replacement for Pyrovalve applications. Features include all-welded titanium construction and a robust, electrically redundant non-pyro actuator. The normally closed PIV features a Frangible Seat that provides a positive seal against internal leakage after actuation. The thick-walled, all-welded titanium pressure boundary prevents external leakage when open or closed.

The PIV actuation mechanism opens the valve with a 100% force margin independent of inlet pressure. The PIV eliminates the explosion hazard, blow-by and shock loads inherent to traditional Pyro Valves.

Features

- High Operating Pressure (5,000 psi/345 bar)
- Positive Isolation:
  - Hermetic Titanium Barrier
  - Burst Tested to 20,000 psi
- All Welded Against Leakage
- Robust Actuation Mechanism:
  - Eliminates Pyrotechnic Charge
  - Low Shock
  - Precludes Blow-By
  - Electrically Redundant
  - Uses Existing Driver Circuits
- Frangible Seat:
  - High Flow Capacity
  - Minimal Debris Generation
  - Positive Retention of Seat Parts

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<td></td>
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<td>Positive Retention of Seat Parts</td>
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Inlet / Outlet Tubes: 1/4" or 3/8" Ti
Iso Valve Response: <120 sec
Internal Leakage: <1 X 10^-6 sccs GHe
External Leakage: <1 X 10^-6 sccs GHe
Weight: 0.50 lbs (227 gms) max
Actuator Mechanism maintains valve in the closed condition until actuated.

When an electrical pulse is applied, Actuator fractures Frangible Seat to open flow path with 100% force margin.

Hermetic Frangible Seat has been hydrostatically tested up to 20,000 psi without failure.

---

**Electrical Schematic**

```
28 VDC  PRIMARY COIL
       |     |
   GND  | REDUNDANT COIL
       |     |
28 VDC  | PRIMARY THERMISTOR
       |  REDUNDANT THERMISTOR
       |
```